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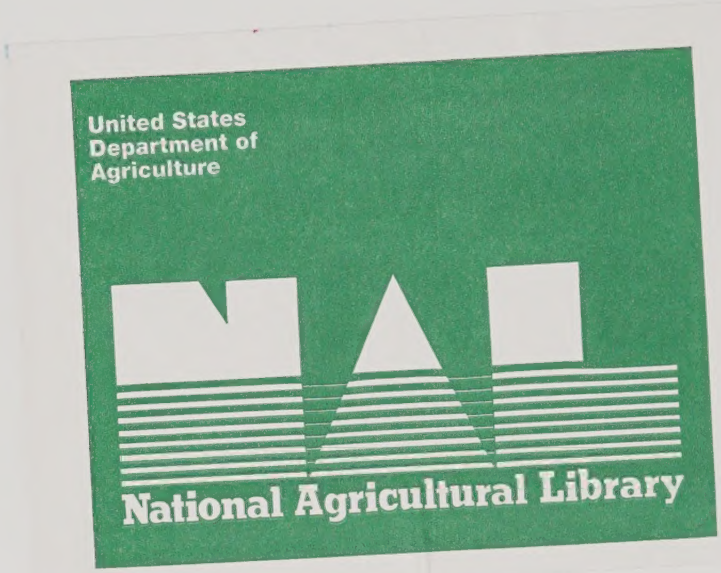
VS

Sheep 2001

Part IV: Baseline Reference of 2001 Sheep Feedlot Health and Management



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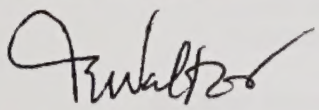
All participants are to be commended, particularly the producers whose voluntary efforts made the Sheep 2001 study possible.

This report has been prepared from material received and analyzed by the U.S. Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS), Veterinary Services (VS) during a study of animal health and management on feedlot operations.

Thomas E. Walton



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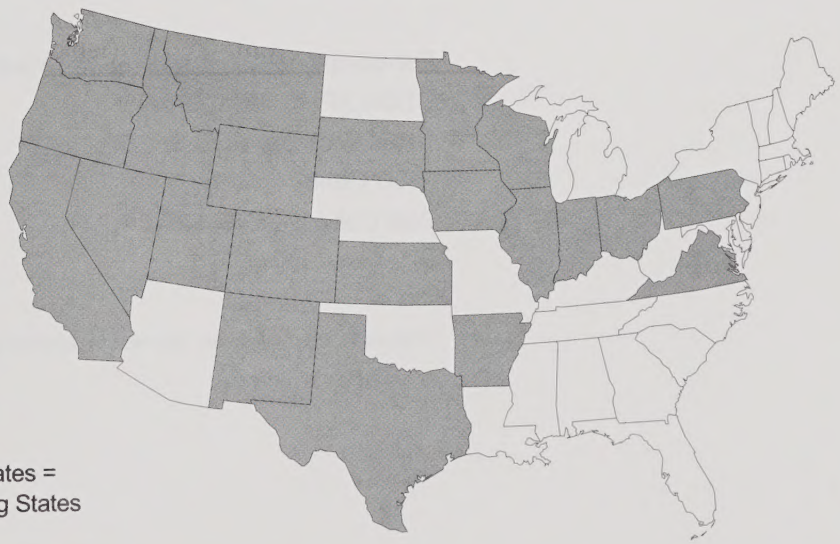
Introduction

As part of the National Animal Health Monitoring System (NAHMS), the USDA:APHIS: Veterinary Services (VS) conducted its first national study of the sheep industry with the 1996 NAHMS National Sheep Survey. This was a voluntary, mail-in survey developed through collaboration with the Research and Education Division of the American Sheep Industry Association (ASI), and focused on identifying health and productivity issues affecting America's sheep industry. The 1996 NAHMS study results provided an overview of sheep health, productivity, and management on 5,174 U.S. operations.

NAHMS' second national sheep study, NAHMS Sheep 2001, was designed to provide both participants and the industry with information on the U.S. sheep flock on operations with one or more sheep. Specific objectives of this study are described in Section II: Methodology. The USDA's National Agricultural Statistics Service (NASS) collaborated with VS to select a producer sample statistically designed to provide inferences to the nation's sheep population in the 22 participating States (see map). These 22 States include the major sheep producing States, accounting for 87.4 percent of the U.S. sheep inventory on January 1, 2001, and 72.3 percent of U.S. sheep producers in 2000.

Part I: Reference of Sheep Management in the United States, 2001. Data from this report were collected from 3,210 operations in the 22 participating States. NASS interviewers contacted producers and collected data for these reports via a questionnaire administered on-site from December 29, 2000, to January 26, 2001.

States Participating in the Sheep 2001 Study



Shaded States = participating States

Part II: Reference of Sheep Health in the U.S., 2001 is the second of a series of reports containing national information resulting from NAHMS Sheep 2001. Data from this report were collected from 1,101 participating operations that had 20 or more ewes. State and Federal veterinary medical officers (VMOs) and animal health technicians (AHTs) collected the data on operations in the 22 participating States between February 5, 2001, and April 27, 2001. The 22-State target population of operations with 20 or more ewes was estimated to represent 42.1 percent of all sheep operations and 92.6 percent of ewes in the 22 States on January 1, 2001.

Part III: Lambing Practices, Spring 2001 is the third of a series of reports from NAHMS Sheep 2001. Data for this report were collected by State and Federal VMOs and AHTs from 870 participating operations via a telephone survey administered from June 4 to June 29, 2001. To be eligible for the telephone survey, operations had to have 20 or more ewes on-site on January 1, 2001, and must have completed lambing by July 1, 2001.

Part IV: Baseline Reference of 2001 Sheep Feedlot Health and Management is the fourth report from the NAHMS Sheep 2001 study. Data for this report were collected from 32 feedlots in 11 participating States[1]. VMOs and AHTs contacted producers and collected data for this report via a questionnaire administered on-site from September 4 through November 16, 2001. The results of this part of the study are unweighted and apply only to the sample. Care should be taken before inferences are made, as these results may not be representative of all feedlots in the United States.

Further information on NAHMS studies and reports are available online at: www.aphis.usda.gov/vs/ceah/cahm

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[1]Colorado, Iowa, Kansas, Minnesota, Montana, Oregon, Pennsylvania, South Dakota, Utah, Wisconsin, Wyoming

Terms Used in This Report

Feedlot: Operations considered feedlots for this report were identified from the NAHMS Sheep 2001 Phase I data collection (General Sheep Management Report questionnaire). A feedlot is any operation with a January 1, 2001, inventory of 500 or more market lambs or sheep that identified themselves as a feedlot and fed a high-energy diet for the purpose of getting their animals to an acceptable slaughter weight.

Feedlot average: A single value for each feedlot is summed over all feedlots reporting divided by the number of feedlots reporting.

Feedlot size: Throughout this report, data are summarized by two size groupings based on the total number of sheep and lambs placed on the operations' feedlots between August 1, 2000, and July 31, 2001. One size group is less than 5,000 head while the other is 5,000 or more.

N/A: Not applicable.

Percentage: Data in tables are reported by percentage of feedlots or by percentage of lambs or sheep. The data reflect only this sample of feedlots.

Sample profile: Information that describes characteristics of the feedlots where Sheep 2001 data were collected, such as feedlots responding by number of head placed on feed (Appendix I).

Section I: Sample Results

Note: Results are not weighted to provide inferences to a larger population beyond the 32 participating feedlots. Therefore, care should be taken before interpretations are made, as the results may not be representative of all feedlots in the United States.

A. Placement Profile

1. Feedlot size

Just over half the 32 participating feedlots fed fewer than 5,000 sheep and lambs between August 1, 2000, and July 31, 2001. However, over 95 percent of the market lambs were fed on the larger operations during that time period.

a. Percentage of feedlots (and percentage of market lambs on July 1, 2001) by feedlot size[1]:

Feedlot Size (Number of Sheep and Lambs)	Percent Feedlots	Percent Market Lambs
Less than 5,000	59.4	4.6
5,000 or more	40.6	95.4
Total	100.0	100.0

[1]Feedlot size is based on the number head placed on feed from August 1, 2000, through July 31, 2001

2. Placement reason

All participating feedlots placed at least some animals on feed for slaughter. However, 18.7 percent of feedlots placed animals on feed for a reason other than slaughter. These were ewe lambs on feed prior to breeding.

a. Percentage of feedlots (and percentage of sheep and lambs placed on feed) by reason for placement at the feedlot from August 1, 2000, through July 31, 2001:

Placement Reason	Percent Feedlots	Percent Sheep/Lambs
Slaughter market	100.0	99.3
Other	18.7	0.7
Total	N/A	100.0

3. Distribution of placements for slaughter

All feedlots placed at least some ram and ewe lambs on feed for the slaughter market. Only 3.1 percent of feedlots placed adult rams on feed for slaughter, while 9.4 percent placed ewes on feed for slaughter. These animals represented less than 0.05 percent of the total animals placed on feed in 2001, and this number sums to zero when rounded to a tenth of a percent.

a. Percentage of feedlots that placed on feed any of the following sheep and lambs for slaughter market (and percentage of any of the following sheep and lambs placed):

Sheep and Lambs	Percent Feedlots	Percent All Sheep and Lambs
Wethers/ram lambs	100.0	64.2
Ewe lambs	100.0	35.8
Adult rams	3.1	0.0*
Adult ewes	9.4	0.0*
Total	N/A	100.0

*Less than 0.05 percent

4. Ownership

a. Percentage of sheep and lambs placed on feed for slaughter, by ownership and by feedlot size:

	Percent Sheep and Lambs		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Ownership	Percent	Percent	Percent
Owned by this operation	98.3	42.2	44.3
Consigned to this feedlot/ ownership retained by producer	1.7	27.8	26.8
Consigned to this feedlot/ ownership retained by lamb buyer	0.0	30.0	28.9
Under other ownership	0.0	0.0	0.0
Total	100.0	100.0	100.0

5. Months feeding high concentrate

a. Percentage of feedlots by number of months from August 1, 2000, through July 31, 2001, that any sheep or lambs were being fed a high-concentrate feed, by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Months	Percent	Percent	Percent
Less than 6	31.6	0.0	18.7
6 or more	68.4	100.0	81.3
Total	100.0	100.0	100.0

Just over 90 percent of feedlots fed sheep and lambs during November 2000 through January 2001. The lowest percentage of feedlots (59.4 percent) fed during June 2001 and July 2001.

b. Percentage of feedlots by month that sheep and lambs were fed high-concentrate feed:

Month	Percent Feedlots
August 2000	65.6
September 2000	78.1
October 2000	87.5
November 2000	90.6
December 2000	90.6
January 2001	90.6
February 2001	81.3
March 2001	65.6
April 2001	62.5
May 2001	65.6
June 2001	59.4
July 2001	59.4

6. Weight distribution of feeder lambs

a. Percentage of feeder lambs placed on feed from August 1, 2000, through July 31, 2001, by weight class at placement:

Weight Class (Pounds)	Percent Feeder Lambs
Less than 85	19.3
85 to 104	58.6
105 to 119	15.5
120 or more	6.6
Total	100.0

B. Management

1. Days from placement to slaughter

a. Percentage of feedlots by the number of days it took feeder lambs to go from placement weight to slaughter weight:

Number of Days	Percent Feedlots
Less than 30	0.0
30 to 59	6.2
60 to 89	34.4
90 or more	59.4
Total	100.0

b. Feedlot average number of days for feeder lambs to go from placement weight to slaughter weight, by feedlot size:

Average Number Days		
Feedlot Size (Number Sheep and Lambs)		
Less Than 5,000	5,000 or More	All Feedlots
Days	Days	Days
101.9	88.8	96.6

2. Weight of feeder lambs at slaughter

a. Average weight in pounds of feeder lambs at slaughter, by feedlot size:

Average Weight (Pounds)		
Feedlot Size (Number Sheep and Lambs)		
Less Than 5,000	5,000 or More	All Feedlots
Pounds	Pounds	Pounds
134.9	142.6	138.0

3. Lambing in feedlot

a. Percentage of feedlots that had ewe lambs placed in their feedlot that lambed from August 1, 2000, through July 31, 2001, by feedlot size:

Percent Feedlots		
Feedlot Size (Number Sheep and Lambs)		
Less Than 5,000	5,000 or More	All Feedlots
Percent	Percent	Percent
26.3	61.5	40.6

b. Percentage of ewe lambs placed in feedlots from August 1, 2000, through July 31, 2002, that lambed, by feedlot size:

Percent Ewe Lambs		
Feedlot Size (Number Sheep and Lambs)		
Less Than 5,000	5,000 or More	All Feedlots
Percent	Percent	Percent
2.1	0.1	0.2

c. For feedlots that had ewe lambs that lambed, percentage of feedlots by most frequent source of these lambs:

Lamb Source	Percent Feedlots
Backgrounders	0.0
Producers	46.1
Sale barns	38.5
Own flock	15.4
Other	0.0
Total	100.0

4. Prearrival information

a. Percentage of feedlots by availability of the following prearrival information:

	Percent Feedlots			
	Availability of Prearrival Information			
	Always	Sometimes	Never	
Prearrival Information	Percent	Percent	Percent	Total
Vaccination history	6.9	44.8	48.3	100.0
Deworming history	6.9	37.9	55.2	100.0
Previous mineral supplementation history	6.9	0.0	93.1	100.0
Knowledge of originating flock	24.1	51.8	24.1	100.0
Other*	23.1	30.8	46.1	100.0

*Age or weaning date

b. Percentage of feedlots by level of the importance of the following prearrival information:

	Percent Feedlots			
	Level of Importance of Prearrival Information			
	Very Important	Somewhat Important	Not Important	
Prearrival Information	**Percent**	**Percent**	**Percent**	**Total**
Vaccination history	20.7	37.9	41.4	100.0
Deworming history	13.8	34.5	51.7	100.0
Previous mineral supplementation history	6.9	17.2	75.9	100.0
Knowledge of originating flock	27.6	44.8	27.6	100.0
Other*	38.5	15.4	46.1	100.0

*Age or weaning date

5. Prearrival processing procedures

a. Percentage of feedlots by whether (in the feedlot's experience) the following prearrival processing procedures reduce sickness or death in feedlot lambs on the feedlot:

	Percent Feedlots Reduces Sickness/Death				
	Yes	Don't Know	No	Not Applicable	
Procedure	Percent	Percent	Percent	Percent	Total
Introduction to feed bunk	58.1	9.7	6.4	25.8	100.0
Clostridial vaccinations given prior to arrival	45.2	19.3	12.9	22.6	100.0
Lambs weaned 2 or more weeks prior to shipping	54.8	16.1	6.5	22.6	100.0
Lambs treated for internal parasites prior to arrival	58.0	9.7	9.7	22.6	100.0
Lambs treated for external parasites prior to arrival	32.2	22.6	22.6	22.6	100.0
Other (includes treating for footrot and holding feed overnight)	18.7	0.0	31.3	50.0	100.0

b. Percentage of feedlots by prearrival processing procedures performed on the last group of lambs placed at the feedlot, by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Procedure	Percent	Percent	Percent
Introduction to feed bunk	29.4	16.7	24.1
Clostridial vaccinations given prior to arrival	17.6	8.3	13.8
Lambs weaned 2 or more weeks prior to shipping	23.5	8.3	17.2
Lambs treated for internal parasites prior to arrival	11.8	8.3	10.3
Lambs treated for external parasites prior to arrival	5.9	8.3	6.9
Other	0.0	0.0	0.0

C. Arrival Management and Group Processing

1. Resources for new arrivals

a. Percentage of feedlots that provided new arrivals with the following resources, by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Resource	**Percent**	**Percent**	**Percent**
Additional pen space	58.8	84.6	70.0
Additional waterer space	76.5	76.9	76.7
Additional bunk space	64.7	92.3	76.7
Placed to allow increased observation	76.5	76.9	76.7
Other*	11.1	0.0	7.1

*Antibiotics

2. Arrival processing

a. Percentage of feedlots that routinely used the following methods specifically to prevent transport tetany, and average number of days used:

Method	Percent Feedlots	Average Number Days Used
Oral electrolytes in water	30.0	5.4
Antibiotics in water	30.0	13.1
Other*	17.7	27.5

*Aureomycin, unspecified antibiotics in feed, or vitamins

b. Percentage of feedlots by average number of hours after arrival that lambs were first processed as a group:

Average Hours	Percent Feedlots
Less than 13	20.0
13 to 24	33.4
25 to 72	23.3
More than 72	23.3
Total	100.0

c. Percentage of feedlots that performed the following procedures during processing, by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Procedure	Percent	Percent	Percent
Vaccinate against clostridium (type C and D only)	83.3	76.9	80.7
Vaccinate against clostridium (7-way)	11.1	30.8	19.3
Vaccinate against clostridium (8-way)	0.0	0.0	0.0
Implant (Ralgro)	0.0	0.0	0.0
Treat for external parasites	5.6	53.8	25.8
Treat for internal parasites	94.4	92.3	93.5
Other procedures*	22.2	0.0	12.9

*Pasteurella bacterin, Clostridium D only, or LA200 SQ

i. Percentage of lambs that received the following procedures during processing, by feedlot size:

	Percent Lambs		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Procedure	**Percent**	**Percent**	**Percent**
Vaccinate against clostridium (type C and D only)	80.8	76.4	76.5
Vaccinate against clostridium (7-way)	12.0	23.2	22.8
Vaccinate against clostridium (8-way)	0.0	0.0	0.0
Implant (Ralgro)	0.0	0.0	0.0
Treat for external parasites	1.0	86.1	83.0
Treat for internal parasites	96.4	92.8	92.9
Other procedures*	35.2	0.0	14.5

*Pasteurella bacterin, Clostridium D only, or LA200 SQ

d. Percentage of feedlots that changed any processing procedures for new arrivals based on each of the following factors:

Factor	Percent Feedlots	Average Cut-off Weight at Which Animals Were Treated Differently (lbs.)
Time of year	29.0	N/A
Arrival weight	29.0	93.7
Distance transported or percentage of shrinkage	32.3	N/A
Source of sheep (sale barn, producers, auction)	30.0	N/A
Preconditioning history	26.7	N/A
Sheep's State of origin	20.0	N/A
Other factors	0.0	N/A

3. Second processing

a. Percentage of feedlots (and percentage of lambs) that processed lambs a second time within 30 days of their arrival at the feedlot:

Percent Feedlots	Percent Lambs
71.0	94.2

i. For feedlots that processed a second time, percentage of feedlots by primary purpose for processing a second time and by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Primary Purpose of Second Processing	Percent	Percent	Percent
Clostridial vaccine booster	80.0	91.7	86.4
Parasite control	10.0	0.0	4.5
Other purposes*	10.0	8.3	9.1
Total	100.0	100.0	100.0

*Pasteurella bacterin, or both booster and parasite control

ii. For feedlots that gave a clostridial vaccine booster during the second processing, percentage of feedlots by type of booster:

Type of Booster	Percent Feedlots
Type D only	10.5
Type C and D only	84.2
7-way	5.3
8-way	0.0
Other factors	0.0
Total	100.0

D. Nutritional Management

1. Concentrate

a. Feedlot average percentage of concentrate on a dry matter basis fed in the following rations:

Ration	Percent Concentrate
Starter rations	27.3
Finishing rations	67.4

2. Feeding methods

a. Percentage of feedlots that used the following methods for feeding lambs, by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Feeding Method	Percent	Percent	Percent
Self feeders	94.7	84.6	90.6
Bunk line system (on ground outside pen)	42.1	69.2	53.1
On ground inside pen	0.0	23.1	9.4
Pasture	15.8	23.1	18.8
Other method*	10.5	0.0	6.3

*Standing corn pasture or bunk line inside pens

i. Percentage of feedlots by primary method used for feeding lambs, by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Primary Feeding Method	Percent	Percent	Percent
Self feeders	73.7	58.3	67.7
Bunk line system (on ground outside pen)	26.3	41.7	32.3
On ground inside pen	0.0	0.0	0.0
Pasture	0.0	0.0	0.0
Other method	0.0	0.0	0.0
Total	100.0	100.0	100.0

3. Nutritional consultant

a. Percentage of feedlots that used the following as nutritional consultants during the previous 3 years, by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Nutritional Consultant	Percent	Percent	Percent
Veterinarian	47.4	46.2	46.9
Private nutritionist who made regular or routine visits	5.3	23.1	12.5
Private nutritionist (called as needed)	5.3	53.8	25.0
Feed company nutritionist	73.7	76.9	75.0
Other*	14.3	11.1	13.0
Any	78.9	84.6	81.3

*Extension or other producers

E. Disease Prevention and Management

1. Injections

a. Percentage of feedlots that gave the following injections (and percentage of lambs placed that were given the injections) from August 1, 2000, through July 31, 2001:

Injection	Percent Feedlots	Percent Lambs
Vitamins A or D	28.1	2.1
Vitamins B	28.1	2.0
Selenium	12.5	0.2
Vitamin E	21.9	2.0
Dewormer	68.7	90.3
Clostridial vaccines	100.0	100.0
Antibiotics	90.3	6.0
Other*	9.4	0.9

*Pasteurella bacterin or dexamethasone

Correctly administering vaccinations can prevent damage to choice cuts of lamb. The majority of participating feedlots vaccinated in the neck region, as recommended in the Sheep Safety and Quality Assurance Program.

b. For feedlots where clostridial injections were given, percentage of feedlots (and percentage of lambs) by location and route of administration:

Location and Route	Percent Feedlots	Percent Lambs
Intramuscularly (IM) in neck region	51.6	42.2
Subcutaneously (SQ) in neck region	54.8	57.8
IM elsewhere	0.0	0.0
SQ elsewhere (ribs)	3.2	0.0
Total	N/A	100.0

c. For feedlots where antibiotic injections were given, percentage of feedlots (and percentage of lambs) by location and route of administration:

Location and Route	Percent Feedlots	Percent Lambs
Intramuscularly (IM) in neck region	57.7	81.6
Subcutaneously (SQ) in neck region	30.8	15.7
IM elsewhere (leg)	11.5	2.3
SQ elsewhere (ribs or brisket)	7.7	0.4
Total	N/A	100.0

d. For feedlots that gave any intramuscular injection, percentage of feedlots that gave intramuscular injections of more than 5cc (5 milliliters) in one site:

Percent Feedlots
10.0

2. Treatment record keeping

a. Percentage of feedlots by how frequently the following information was recorded when lambs treated ***individually*** were given antibiotics (by injection or orally):

	Percent Feedlots			
	Frequency			
	Always/ Sometimes	Never	Not Applicable	
Information Recorded	**Percent**	**Percent**	**Percent**	**Total**
Date given	26.6	73.4		100.0
Type of antibiotic	30.0	70.0		100.0
Amount given	26.7	73.3		100.0
Product lot/serial number	3.4	96.6		100.0
Withdrawal time	25.0	75.0		100.0
Disease condition (shipping fever, pneumonia, etc.)	20.0	80.0		100.0
Outcome of treatment (returned to pen, died, culled)	13.4	86.6		100.0
Route of injection (if applicable)	13.3	83.4	3.3	100.0
Location of injection (neck, loin, leg, other)	16.7	80.0	3.3	100.0

b. Percentage of feedlots by how frequently the following information was recorded when lambs treated as a ***group*** were given antibiotics (by injection or orally):

	Percent Feedlots			
	Frequency			
	Always/ Sometimes	Never	Not Applicable	
Information Recorded	**Percent**	**Percent**	**Percent**	**Total**
Date given	30.8	69.2		100.0
Type of antibiotic	36.0	64.0		100.0
Amount given	28.0	72.0		100.0
Product lot/serial number	4.2	95.8		100.0
Withdrawal time	21.7	78.3		100.0
Disease condition (shipping fever, pneumonia, etc.)	12.0	88.0		100.0
Outcome of treatment (returned to pen, died, culled)	12.0	88.0		100.0
Route of injection (if applicable)	12.0	84.0	4.0	100.0
Location of injection (neck, loin, leg, other)	16.0	80.0	4.0	100.0

c. Percentage of feedlots that identified treated lambs individually:

Percent Feedlots
67.7

i. For feedlots that identified treated lambs individually, percentage of feedlots by type of identification used:

Type of Identification	Percent Feedlots
Paint	9.5
Chalk	85.7
Ear tag	0.0
Other types*	9.5

*Treated animal was physically separated from untreated animals

3. Antibiotics in feed or water

a. Percentage of feedlots that used antibiotics in feed or water from August 1, 2000, through July 31, 2001:

Antibiotics In:	Percent Feedlots
Feed	78.1
Water	31.3
Either feed or water	84.4

i. For feedlots that used antibiotics in feed or water, percentage of feedlots that used the following antibiotics in feed and in water:

	Percent Feedlots	
Antibiotics	**In Feed**	**In Water**
Aureomycin premix	63.0	0.0
Tetracycline	44.4	25.9
Neomycin sulfate	0.0	3.7
Other antibiotics	0.0	18.2

ii. For feedlots that used antibiotics in feed or water, percentage of feedlots that used antibiotics in feed or water for the following reasons:

Reason	Percent Feedlots
Disease treatment	51.9
Prevention	88.9
Growth Promotion	40.7

4. Parasite treatments

a. Percentage of feedlots that dewormed any lambs from August 1, 2000, through July 31, 2001:

Percent Feedlots
93.7

i. For feedlots that dewormed, percentage of feedlots by typical frequency that lambs were dewormed while in the feedlot:

Deworming Frequency	Percent Feedlots
Once	89.7
Twice	6.9
Three or more	3.4
Continuous (in feed)	0.0
Total	100.0

b. For feedlots that dewormed, percentage of feedlots by frequency that dewormers were rotated:

Rotation Frequency	Percent Feedlots
More frequently then yearly	7.1
Every 1 or 2 years	10.7
Less frequently than 2 years	3.6
Did not rotate	78.6
Total	100.0

c. Percentage of feedlots that gave any lambs the following parasiticides to treat or prevent internal or external parasites, by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Parasiticide	**Percent**	**Percent**	**Percent**
Oral (drench or bolus)			
Albendazole (i.e., Valbazen®)	57.9	46.2	53.1
Fenbendazole (i.e., Panacur®, Safe-Guard)	0.0	0.0	0.0
Ivermectin (i.e., Ivomec® Sheep Drench)	5.3	7.7	6.3
Levamisole (i.e., Levasole, Tramisole, Ripericol)	15.8	0.0	9.4
Oxfendazole (i.e., Synanthic)	0.0	0.0	0.0
Pyrantel Pamoate (i.e., Strongid®-T)	0.0	0.0	0.0
Thiabendazole (i.e., Omnizole, BZ-Thibenzole)	5.3	0.0	3.1
Other drench or bolus dewormers	0.0	0.0	0.0
Injectable			
Doramectin (i.e., Dectomax® Injectable)	0.0	0.0	0.0
Ivermectin (i.e., Ivomec® Injectable)	15.8	15.4	15.6
Levamisole (i.e., Levasole, Tramisole, Ripericol)	15.8	61.5	34.4
Other injectable dewormers	0.0	0.0	0.0
Pour-on			
Doramectin (i.e., Dectomax® Pour-on)	0.0	7.7	3.1
Levamisole (i.e., Levasole, Tramisole, Ripericol)	0.0	0.0	0.0
Moxidectin (i.e., Cydectin)	0.0	0.0	0.0
Other pour-on dewormers (includes Permethrin and Fenvalerate)	5.3	23.1	12.5

i. Percentage of lambs placed on feed that were given the following parasiticides, by feedlot size:

	Percent Lambs		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Parasiticide	**Percent**	**Percent**	**Percent**
Oral (drench or bolus)			
Albendazole (i.e., Valbazen)	39.8	15.6	16.5
Fenbendazole (i.e., Panacur, Safe-Guard)	0.0	0.0	0.0
Ivermectin (i.e., Ivomec Sheep Drench)	5.0	2.5	2.6
Levamisole (i.e., Levasole, Tramisole, Ripericol)	18.0	0.0	0.7
Oxfendazole (i.e., Synanthic)	0.0	0.0	0.0
Pyrantel Pamoate (i.e., Strongid-T)	0.0	0.0	0.0
Thiabendazole (i.e., Omnizole, BZ-Thibenzole)	7.0	0.0	0.3
Other drench or bolus dewormers	0.0	0.0	0.0
Injectable			
Doramectin (i.e., Dectomax Injectable)	0.0	0.0	0.0
Ivermectin (i.e., Ivomec Injectable)	10.2	19.7	19.3
Levamisole (i.e., Levasole, Tramisole, Ripericol)	16.3	64.8	62.9
Other injectable dewormers	0.0	0.0	0.0
Pour on			
Doramectin (i.e., Dectomax Pour-on)	0.0	10.1	9.7
Levamisole (i.e., Levasole, Tramisole, Ripericol)	0.0	0.0	0.0
Moxidectin (i.e., Cydectin)	0.0	0.0	0.0
Other pour-on dewormers (includes Permethrin and Fenvalerate)	1.9	51.8	49.9

d. Percentage of feedlots that conducted fecal parasite testing from August 1, 2000, through July 31, 2001:

Percent Feedlots
31.3

5. Coccidiostat use

a. Percentage of feedlots that used coccidiostats in feed or water from August 1, 2000, through July 31, 2001:

Coccidiostats In:	Percent Feedlots
Feed	81.3
Water	21.9
Either feed or water	84.4

i. For feedlots that used coccidiostats in either feed or water, percentage of feedlots by use of the following coccidiostats in feed and in water:

	Percent Feedlots	
Coccidiostats	**Feed**	**Water**
Ionophores (Rumensin®, Bovatec®, lasalocid)	81.5	0.0
Sulfa drugs	3.7	11.1
Decoquinate (Deccox®)	29.6	3.7
Other coccidiostats (includes Corid)	0.0	12.0

F. Sick Animal Management

1. Lamb deaths

a. Percentage of lambs[1] that died or were lost from August 1, 2000, through July 31, 2001, by feedlot size:

Percent Lambs		
Feedlot Size (Number Sheep and Lambs)		
Less Than 5,000	5,000 or More	All Feedlots
Percent Lambs	Percent Lambs	Percent Lambs
3.0	1.2	1.3

[1]Number died as a percentage of number lambs placed

b. Percentage of feedlots that lost one or more lambs to the following diseases from August 1, 2000, through July 31, 2001, by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Disease	Percent	Percent	Percent
Shipping fever pneumonia	57.9	84.6	68.8
Other respiratory disorders	26.3	84.6	50.0
Enterotoxemia	63.2	92.3	75.0
Bloat	21.1	38.5	28.1
Other digestive disorders	42.1	53.8	46.9
Urolithiasis (urinary calculi, water belly)	68.4	69.2	68.7
Central nervous system disorder (e.g., thiamine deficiency)	15.8	38.5	25.0
Rectal prolapse	78.9	84.6	81.3
Transport tetany	15.8	53.8	31.3
Choke	5.3	38.5	18.7
Lameness/injury	26.3	38.5	31.3
Predation	15.8	30.8	21.9
Other known cause (includes crowding and parasites)	21.1	15.4	18.7
Other unknown cause	42.1	46.2	43.7

i. For the lambs that died, percentage of lambs that died due to the following diseases from August 1, 2000, through July 31, 2001, by feedlot size:

	Percent Lambs That Died		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Disease	**Percent**	**Percent**	**Percent**
Shipping fever pneumonia	34.1	10.8	12.8
Other respiratory disorders	6.2	31.1	29.0
Enterotoxemia	13.0	30.1	28.7
Bloat	3.0	1.0	1.2
Other digestive disorders	7.6	6.0	6.1
Urolithiasis (urinary calculi, water belly)	9.7	2.4	3.1
Central nervous system disorder (e.g., thiamine deficiency)	1.6	0.4	0.5
Rectal prolapse	5.8	4.4	4.5
Transport tetany	0.6	2.1	1.9
Choke	0.1	1.1	1.0
Lameness/Injury	1.1	1.5	1.4
Predation	0.9	1.2	1.2
Other known causes*	7.0	5.7	5.8
Other unknown cause	9.3	2.2	2.8
Total	100.0	100.0	100.0

*Crowding or parasites

c. Percentage of feedlots that generally perform necropsies on lambs that died from an unknown reason:

Percent Feedlots
46.7

2. Treatments

a. Percentage of feedlots by how often the following treatment location protocols were used:

	Percent Feedlots				
	Frequency				
	Always/ Usually	Sometimes	Never	No Hospital Pen	
Protocol	Percent	Percent	Percent	Percent	Total
Treat in hospital area and leave animals in hospital pen for 24 hours or more	46.9	40.6	6.3	6.2	100.0
Treat in hospital area and remove animals from the hospital pen in less than 24 hours	0.0	21.9	71.9	6.2	100.0
Treat in home pen or alley	15.6	43.8	40.6	0.0	100.0

G. Other Management

1. Feedback from slaughter plants

a. Percentage of feedlots by how frequently information about lambs sent to slaughter was received from the slaughter plant, and by type of information received:

	Percent Feedlots			
	Frequency			
	Always	Sometimes	Never	
Type of Information	Percent	Percent	Percent	Total
Dressing percentage	34.4	50.0	15.6	100.0
Offal condemnation	12.5	25.0	62.5	100.0
Pelt quality	25.0	28.1	46.9	100.0
Carcass condemnation	50.0	18.7	31.3	100.0
Bruising percentage	3.1	15.6	81.3	100.0
Carcass yield grade	38.7	41.9	19.4	100.0
Parasite loads (including flukes or intestinal parasites)	0.0	18.7	81.3	100.0

b. Percentage of feedlots by level of importance of the information received from the slaughter plant, and by type of information received:

	Percent Feedlots				
	Importance Level				
	Very Important	Somewhat Important	Not Important	Not Received	
Type of Information	Percent	Percent	Percent	Percent	Total
Dressing percentage	68.7	21.9	6.3	3.1	100.0
Offal condemnation	21.9	25.0	28.1	25.0	100.0
Pelt quality	40.6	25.0	12.5	21.9	100.0
Carcass condemnation	34.4	40.6	9.4	15.6	100.0
Bruising percentage	15.6	34.4	18.7	31.3	100.0
Carcass yield grade	59.3	28.1	6.3	6.3	100.0
Parasite loads (including flukes or intestinal parasites)	18.8	37.5	15.6	28.1	100.0

2. Feedback to lamb sources

a. Percentage of feedlots by the frequency that any information (e.g., occurrence of disease, performance, or carcass quality) was given to the sources of lambs placed on the feedlot, and by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Frequency	**Percent**	**Percent**	**Percent**
Always or most of the time	0.0	15.4	6.3
Sometimes	15.8	38.5	25.0
Never or almost never	57.9	38.4	50.0
Not applicable (only place own animals)	26.3	7.7	18.7
Total	100.0	100.0	100.0

3. ASI quality assurance program

a. Percentage of feedlots by level of familiarity with the 1995 American Sheep Industry (ASI) sheep quality assurance program:

Familiarity	Percent Feedlots
Very familiar (have used it)	6.3
Somewhat familiar (have seen it)	15.6
Heard of it	40.6
Never heard of it	37.5
Total	100.0

4. Manure disposal

a. Percentage of feedlots that used any of the following methods to dispose of manure from August 1, 2000, through July 31, 2001:

Disposal Method	Percent Feedlots
Applied to land owned, rented, or leased by this feedlot	90.6
Applied to land not owned, rented, or leased by this feedlot	28.1
Sold or received other compensation	15.6
Given away	28.1
Composted	25.0
Other disposal method	0.0

i. Percentage of feedlots by ***primary*** method used to dispose of manure from August 1, 2000, through July 31, 2001:

Primary Disposal Method	Percent Feedlots
Applied to land owned, rented, or leased by this feedlot	84.4
Applied to land not owned, rented, or leased by this feedlot	6.3
Sold or received other compensation	3.1
Given away	0.0
Composted	6.2
Other primary disposal method	0.0
Total	100.0

5. Resources

a. Percentage of feedlots that provided the following resources for lambs in their home pens (excluding hospital, receiving, and shipping pens) by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Resource	Percent	Percent	Percent
Wind breaks	78.9	50.0	67.7
Shade (e.g., trees, or sheds with 1 or 2 walls)	57.9	33.3	48.4
Shed or barn (3 or 4 walls)	73.7	50.0	64.5
Sprinklers	5.3	8.3	6.5
Mounds	52.6	66.7	58.1

b. Percentage of feedlots that gave bedding material to lambs, by season:

Percent Feedlots	
Wet Season	Dry Season
Percent	Percent
96.8	38.7

i. For feedlots that gave bedding, percentage of feedlots by how bedding was distributed in pens, by season:

	Percent Feedlots	
	Wet Season	Dry Season
Distribution	**Percent**	**Percent**
Throughout pen	46.7	33.3
In sleeping area only	50.0	66.7
In walking and feeding areas	0.0	0.0
Other (includes mounds)	3.3	0.0
Total	100.0	100.0

c. Percentage of feedlots by primary sources of water and by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Primary Water Source	**Percent**	**Percent**	**Percent**
Well	84.2	41.7	67.8
Municipal/city water	15.8	50.0	29.0
Spring/river	0.0	8.3	3.2
Pond/lake	0.0	0.0	0.0
Other water source	0.0	0.0	0.0
Total	100.0	100.0	100.0

H. Biosecurity

1. Visitor restrictions

a. Percentage of feedlots that allowed visitors (people other than employees) into the feedlots' animal raising areas:

Percent Feedlots
87.1

i. For feedlots that allowed visitors into animal raising areas, percentage of feedlots that had the following biosecurity controls in place, by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Biosecurity Control	**Percent**	**Percent**	**Percent**
Restrict movement of visitors in feedlot to areas outside animal holding pens	17.6	50.0	29.6
Change or clean boots required	0.0	0.0	0.0
Require visitors to have not been on another sheep operation for a specified time period	5.9	0.0	3.7
Other biosecurity controls*	0.0	10.0	3.7

*Restricting international visitors

2. Animal control

a. Percentage of feedlots by the level of problem posed by the following animals:

	Percent Feedlots Level of Problem				
	Major	Moderate	Minimal	None	
Animals	**Percent**	**Percent**	**Percent**	**Percent**	**Total**
Stray dogs	3.2	9.7	61.3	25.8	100.0
Coyotes	25.8	16.2	29.0	29.0	100.0
Stray domestic cats	0.0	3.2	22.6	74.2	100.0
Wild ruminants (e.g., deer and elk)	3.2	6.5	9.7	80.6	100.0
Rodents	9.7	25.8	32.3	32.2	100.0
Small animals (e.g., raccoons, skunks, rabbits, squirrels)	3.2	12.9	29.0	54.9	100.0
Birds	3.2	32.3	19.3	45.2	100.0
Predators other than coyotes (includes foxes)	3.8	3.9	7.7	84.6	100.0

i. Percentage of feedlots by effort expended to control the following animals on the feedlot premises:

	Percent Feedlots Control Effort				
	Aggressive	Moderate	Minimal	None	
Animals	Percent	Percent	Percent	Percent	Total
Stray dogs	35.5	9.7	25.8	29.0	100.0
Coyotes	32.3	19.3	16.1	32.3	100.0
Stray domestic cats	3.2	0.0	16.1	80.7	100.0
Wild ruminants (e.g., deer and elk)	3.2	3.2	3.2	90.4	100.0
Rodents	19.4	25.8	25.8	29.0	100.0
Small animals (e.g., raccoons, skunks, rabbits, squirrels)	6.5	9.7	16.1	67.7	100.0
Birds	3.2	3.2	16.2	77.4	100.0
Predators other than coyotes (includes foxes)	4.2	4.2	8.3	83.3	100.0

3. Rodent control

a. Percentage of feedlots that used rodent control:

Percent Feedlots
90.3

i. For feedlots that used rodent control, percentage of feedlots by the following methods of control and by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Method	**Percent**	**Percent**	**Percent**
Cats	76.5	63.6	71.4
Traps	29.4	0.0	17.9
Bait or poison	76.5	81.8	78.6
Professional exterminator	17.6	9.1	14.3
Other controls*	7.7	40.0	16.7

*Dogs or shooting

4. Predator control

a. Percentage of feedlots that used predator control:

Percent Feedlots
90.3

b. For feedlots that used predator control, percentage of feedlots by method of predator control used and by feedlot size:

	Percent Feedlots		
	Feedlot Size (Number Sheep and Lambs)		
	Less Than 5,000	5,000 or More	All Feedlots
Method	**Percent**	**Percent**	**Percent**
Guardian animals	52.9	54.5	53.5
Shooting/trapping	70.6	72.7	71.4
Electric fencing	29.4	9.1	21.4
Other methods*	28.6	20.0	26.3

*Perimeter fencing, lights, or restricting sheep to pens at night

5. Polyethylene contamination control

a. Percentage of feedlots that attempted to control polyethylene contamination of wool using the following methods, by frequency of use:

	Percent Feedlots				
	Frequency				
	Always	Sometimes	Never	Not Applicable	
Method	Percent	Percent	Percent	Percent	Total
Produce or buy feeds packaged with polyethylene	6.5	32.2	54.8	6.5	100.0
Remove all polyethylene from facilities and working areas	64.5	6.5	3.2	25.8	100.0
Train employees as to the importance of polycontamination	54.9	3.2	12.9	29.0	100.0
Use wool bale containers made from burlap or nonpolyethylene plastic	90.3	0.0	3.2	6.5	100.0
Ensure that no polyethylene and/or polypropylene tarps or bags are used to move sheep to shearing facilities	58.1	3.2	16.1	22.6	100.0

Section II. Methodology

A. Needs Assessment

NAHMS develops study objectives by exploring existing literature and contacting industry members about their informational needs and priorities during a needs assessment phase. The needs assessment for the NAHMS Sheep 2001 study afforded producers and others affiliated with the sheep industry the opportunity to prioritize sheep health and productivity issues so that the study could focus on the areas of greatest importance. The objective of the needs assessment for the NAHMS Sheep 2001 study was to conduct a national survey to collect information from U.S. sheep producers and other commodity specialists about what they perceived to be the most important sheep health and productivity issues. A driving force of the needs assessment was the desire of NAHMS researchers to receive as much input as possible from a variety of sheep producers, as well as from industry experts and representatives, veterinarians, sheep extension specialists, universities, and sheep organizations. The data collected from the needs assessment helped set the focus and objectives for the study by concentrating on areas most important to the industry.

The primary data collection method used for the NAHMS Sheep 2001 study needs assessment was a survey (the "Sheep Health Study Survey") to collect qualitative data. The survey was accessible in one of two ways: by linking to the USDA:APHIS:VS Web site or by calling a 1-800 telephone number. The survey was made available beginning February 15, 2000, and it was initially scheduled to terminate March 31, 2000. However, in order to capture as many responses as possible, and because there was a fairly high response rate, the data collection period was extended to April 30, 2000. The Web/phone hits were automated and put into a database for statistical analysis at a later date. Surveys also were distributed to all State veterinarians, as well as to a number of sheep extension specialists, sheep organization leaders, and university agriculture researchers in every State. The survey also was advertised in American Sheep Industry Association (ASI) newsletters, in major sheep magazines such as *The Shepherd*, and in numerous other sheep association

publications and bulletins. A total of 459 surveys were completed, either on the Internet, on the phone, or via mailed-in hard copy. Conference calls and five focus-group meetings (USAHA 1998, American Sheep Industry 1999 and 2000, and the America Farm Bureau Federation in 1999 and 2000) with industry leaders also were simultaneously conducted to gain a more balanced perspective of current sheep health concerns during discussion-based meetings.

Specific objectives for the NAHMS Sheep 2001 study:

1. Estimate the regional and national prevalence of specific diseases and conditions of sheep, such as Johne's, intestinal parasites, abortions, and ovine progressive pneumonia.

2. Conduct genomic testing for genetic factors that may be related to susceptibility to clinical signs of scrapie. Describe the prevalence of potential risk factors believed to be associated with scrapie.

3. Describe health management practices used by U.S. sheep producers affecting morbidity (e.g., footrot) and mortality. These practices include animal movement and identification, feeding practices, biosecurity procedures, use of veterinary services, source of health information, vaccination, and treatment practices.

4. Describe nutritional practices and micronutrient intake levels that may impact sheep health by region.

B. Sampling and Estimation

1. State selection

The preliminary selection of States to be included in the study was done in January 2000, using the National Agricultural Statistics Service (NASS), USDA January 29, 1999, Sheep and Goat Report. A goal for NAHMS national studies is to include States that account for at least 70 percent of the animal and producer populations in the United States. The initial review of States identified 16 major States with 82 percent of the inventory but only 62 percent of the operations. A review in January 2000 suggested an increase in the number of States in the Central and Eastern regions.

A workload memo identifying the 19 States in relation to all States in terms of size (inventory and operations) was provided to the USDA:APHIS:VS Regional Directors in February 2000. Each of the Regional Directors sought input from their respective States about being included or excluded from the study. The 19 States provided coverage of 86 percent of the sheep in the United States and 70 percent of the operations. The States were: CA, CO, IA, ID, IL, IN, KS, MN, MT, NM, OH, OR, PA, SD, TX, UT, VA, WI, and WY. By midyear, three additional States were included based on State interest: AR, NV and WA. As of January 1, 2001, these 22 States accounted for 87.4 percent (6,089,000 head) of the sheep and lambs in the United States and 72.3 percent (47,800) of the operations with sheep or lambs in the United States (See Appendix II for respective data on individual States.)

2. Operation selection

A review of the size of operations based on data from the 1997 Census of Agriculture showed a large proportion of small farms (54.1 percent of all the 65,790 farms with sheep or lambs had 1-24 head). For this reason the reference population was chosen to be those operations with one or more head.

The list sample frame was provided by the NASS. Within each State a stratified random sample was selected. The size indicator was total sheep and lamb inventory for each operation. NASS selects a sample of sheep producers in each State for making the NASS January 1 sheep estimates. The list sample from the January 2000 survey was used as the screening sample (n=12,258). Those producers reporting one or more sheep or lambs on January 1, 2000, were included in the sample for contact in January 2001. Due to large predicted workload the sample was reduced in some States by excluding a replicate(s), as necessary, for a final screening sample of 9,964 operations.

For the VS phase, operations with 20 or more ewes that participated in the NASS phase were invited to continue in the study.

The sheep feedlots that participated in this study were identified on the NAHMS Sheep 2001 Phase I data collection (General Sheep Management Report questionnaire) during December 29, 2000-January 26, 2001. Any operation that responded that they had an inventory of 500 or more market lambs or sheep on January 1, 2001, identified themselves as being a feedlot, and fed a high-energy diet for the purpose of getting their animals to an acceptable slaughter weight was eligible for the feedlot portion of the study. A total number of 45 operations were eligible, of which 32 (71 percent) responded to the questionnaire.

3. Population inferences

Inferences from Phase I data collection may be extended to the population of sheep producers with at least one sheep in the 22 participating States. These States account for 72.3 percent of the operations with sheep or lambs in the United States and 87.4 percent of the sheep and lambs inventory as of January 1, 2001. For data collection Phase I, II, and III, all respondent data were statistically weighted to reflect the population from which they were selected. The inverse of the probability of selection for each operation was the initial selection weight. This selection weight was adjusted for nonresponse with each State and size group to allow for the inferences back to the original population from which the sample was selected. Weights were adjusted for nonresponse within regions, size groups, and flock type for operations eligible to continue to the study's second phase.

Inferences for Phase II and III data collection cover the population of sheep producers with at least 20 ewes in the 22 States. The 22-State target population of operations with 20 or more ewes was estimated to represent 42.1 percent of all sheep operations and 92.6 percent of ewes in the 22 States on January 1, 2001 (see Appendix II).

No population inferences are made from Phase IV Feedlot survey data collection. The original stratified random design was not intended to capture a representation of feedlots in the United States. Therefore, the decision was made to present a raw, unweighted descriptive summary of the information. The results of the study apply to the sample, and care should be taken before inferences are made to the population level of sheep feedlots in the United States. Therefore, for Phase IV reporting, there are no inferences to a population of feedlots in the United States.

C. Data Collection

1. Phase I

Sheep 2001 General Sheep Management Report, December 29, 2000, to January 26, 2001. National Agricultural Statistics Service (NASS) enumerators administered the General Sheep Management Report. The interview took slightly over 1 hour.

2. Phase II

Sheep 2001 VS Visit. Data were collected from producers by Federal or State veterinary medical officers (VMOs) or animal health technicians (AHTs) from February 5, 2001, to April 27, 2001. The interview took approximately 1.5 hours.

3. Phase III

Sheep 2001 Telephone Interview. Data were collected from producers by Federal and State VMOs and AHTs from June 4 to June 29, 2001. Most (70.0 percent) of the surveys were completed by phone interview, which took approximately 29 minutes.

4. Phase IV

Sheep 2001 Feedlot Questionnaire. Data were collected from producers by Federal and State VMOs and AHTs from September 4, 2001, through November 16, 2001. The interview took approximately 1 hour.

D. Data Analysis

1. Validation and estimation

a. Initial data entry and validation from the Phase I data collection (General Sheep Management Report) were performed in individual NASS State offices. Data were entered into a SAS data set. NAHMS national staff performed additional data validation on the entire data set after data from all States were combined.

b. Completed questionnaires for Phases II-IV were sent to State NAHMS Coordinators, where they were manually reviewed for accuracy and then sent to CEAH. Data entry and validation were completed at CEAH and entered into SAS.

2. Response rates

a. Phase I: Of the 9,964 operations in the screening sample, 4,884, operations had no sheep or lambs on January 1, 2000, and were therefore ineligible for the NAHMS Sheep 2001 study. This left a total of 5,080 operations to be contacted by NASS in January 2001 (see table below). Of these 5,080 sheep operations, 3,210 participated in this initial phase of the Sheep 2001 study. This phase occurred from December 29, 2000, to January 26, 2001, and included the administration of a questionnaire by NASS enumerators.

Response Category	Number Operations	Percent Operations
No sheep on January 1, 2001	468	9.2
Out of business[1]	159	3.1
Refusal	870	17.1
Survey completed and VMO consent	1,775	35.1
Survey completed, refused VMO consent	993	19.4
Survey completed, ineligible for VMO	442	8.7
Out of scope (prison, research farm, etc.)	51	1.0
Inaccessible	322	6.4
Total	5,080	100.0

[1]Operations that sold land and/or sheep and had no intention of returning to sheep business

b. Phase II: VS visit responses were completed for all 1,775 producers turned over to VS with 20 or more ewes. Of these, 1,101 producers participated.

Response Category	Number Operations	Percent Operations
Survey completed	1,101	62.0
Producer not contacted	149	8.3
Poor time of year or no time	189	11.0
Did not want anyone on operation	6	0.3
Bad experience with government veterinarians	7	0.3
Did not want to do another survey or divulge information	131	7.4
Told NASS they did not want to be contacted	7	0.3
Ineligible (no sheep)	32	1.8
Other reason	40	2.2
Unable to contact	113	6.4
Total	1,775	100.0

c. Phase III: Interviews (primarily by telephone) were made to the 1,101 producers who participated in the VS visit Phase II. Of these, 870 producers or 79.0 percent participated in the survey.

Response Category	Number Operations	Percent Operations
Survey completed	870	79.0
Producer not contacted	155	14.1
Poor time of year or no time	15	1.4
Did not want to do another survey or divulge information	28	2.5
Ineligible (no sheep)	8	0.7
Other reason	25	2.3
Total	1,101	100.0

d. Phase IV: Interviews were made to 45 eligible feedlots turned over to VS from Phase I with 500 or more market lambs or sheep, identified themselves as a feedlot, and fed a high-energy diet for the purpose of getting their animals to an acceptable slaughter weight. Of these, 32 feedlots or 71.1 percent participated in the feedlot survey.

Response Category	Number Feedlots	Percent Feedlots
Survey completed	32	71.1
Producer not contacted	2	4.5
Poor time of year or no time	4	8.9
Other reason	6	13.3
Ineligible	1	2.2
Total	45	100.0

Appendix I: Sample Profile

A. Responding Operations

1. Total number sheep

Phase I: General Sheep Management Report		Phase II: VMO Initial Visit		Phase III: Telephone Survey	Phase IV: Feedlot Survey	
Flock Size (Number of Sheep)	Number Responding Operations	Flock Size (Number of Ewes)	Number Responding Operations	Number Responding Operations	Number Head Placed	Number Responding Operations
1-24	448	Less than 100	536	432	Less than 5,000	19
25-99	956	100-499	368	293	5,000 or more	13
100-999	1,370	500 or more	197	145		
1,000 or more	436					
Total	3,210	Total	1,101	870	Total	32

2. Primary flock type

	Phase I: General Sheep Management Report	Phase II: VMO Initial Visit	Phase III: Telephone Survey	Phase IV: Feedlot Survey
Primary Flock Type	Number Responding Operations	Number Responding Operations	Number Responding Operations	Number Responding Operations
Herded/Open Range	219	87	56	4
Fenced Range	938	293	237	1
Farm Flock	1,975	714	571	8
Feedlot	78	7	6	19
Total	3,210	1,101	870	32

Appendix II: U.S. Sheep and Lamb Inventory and Operations

A. Regional Summary

NASS[1]

Region	State	Number (Thousand Head) January 1, 2001			Number of Operations with Sheep	Percent[2]		
		Ewes 1 year or older	Market Sheep and Lambs	All Sheep and Lambs	2000	Ewes on Operations with 20 or more Ewes	Sheep on Operations with 20 or More Ewes	Operations with 20 or More Ewes
Pacific	California	320	465	840	3,000			
	Oregon	120	94	245	3,000			
	Washington	35	10	54	1,200			
	Total	475	569	1,139	7,200	90.6	86.3	31.9
West Central	Colorado	165	225	420	1,900			
	Idaho	195	39	275	1,000			
	Montana	265	30	360	2,000			
	Nevada	68	12	95	300			
	New Mexico	165	55	255	900			
	Texas	710	310	1,150	6,800			
	Utah	300	40	390	1,500			
	Wyoming	340	110	530	900			
	Total	2,208	821	3,475	15,300	96.9	81.5	46.9
Central	Arkansas	N/A	N/A	N/A	N/A			
	Illinois	48	14	75	2,400			
	Indiana	45	7	66	2,200			
	Iowa	144	95	270	4,700			
	Kansas	58	39	110	1,500			
	Minnesota	90	60	170	2,600			
	South Dakota	265	105	420	2,300			
	Wisconsin	53	14	80	2,200			
	Total	703	334	1,191	17,900	86.5	77.0	44.6
Eastern	Ohio	86	32	142	3,600			
	Pennsylvania	54	12	81	2,500			
	Virginia	37	15	61	1,300			
	Total	177	59	284	7,400	78.9	77.6	40.1
Total (22 States)		3,563 (87.1% of U.S.)	1,783 (89.2% of U.S.)	6,089 (87.4% of U.S.)	47,800 (72.3% of U.S.)	92.6	81.2	42.1
Total U.S. (50 States)		4,091	1,998	6,965	66,100			

N/A = not available

[1] Source: National Agricultural Statistics Service (NASS), USDA; NASS Sheep and Goats, February 1, 2002

[2] Source: Percentage estimates generated based on NAHMS Phase I data collection.

B. Size Group Summary

1. Source: United States Census of Agriculture, U.S. Department of Commerce, 1997

Sheep and Lamb Size Groups	Sheep and Lamb Inventory Dec. 1, 1997 (Thousand Head)	Farms (Operations) With Sheep and Lambs 1997
1-24	349	35,584
25-99	959	20,461
100-299	963	6,010
300-999	1,237	2,429
1,000-2,499	1,255	820
2,500-4,999	1,000	297
5,000 or more	2,059	189
Total	7,822	65,790

2. Source: United States Department of Agriculture, NASS

Breeding Sheep	Percent	
	Inventory January 1, 2001	Operations
1-99	28.8	90.8
100-499	23.8	7.5
500-4,999	33.7	1.6
5,000 or more	13.7	0.1
Total	100.0	100.0

Appendix III: Completed and Expected Outputs and Related Study Objectives

1) Estimate the regional and national prevalence of specific diseases and conditions of sheep, such as Johne's, intestinal parasites, abortions, and ovine progressive pneumonia.

- Johne's and the U.S. Sheep industry (info sheet), expected winter 2004
- Intestinal Parasitism in U.S. Sheep (info sheet), expected winter 2004
- Ovine Progressive Pneumonia: Awareness, Management, and Seroprevalence (info sheet), January 2004

2) Conduct genomic testing for genetic factors that may be related to susceptibility to clinical signs of scrapie.

- Scrapie Awareness and Prevention on U.S. Sheep Operations, January 2004
- Distribution of Genotypes at Codon 171 in U.S. Sheep (info sheet), January 2004

3) Describe health management practices used by U.S. sheep producers affecting morbidity (e.g., footrot) and mortality. This would include animal movement and identification, feeding practices, biosecurity procedures, use of veterinary services, source of health information, vaccination, and treatment practices.

- Part I: Reference of Sheep Management in the United States, 2001, July 2002
- Highlights of NAHMS Sheep 2001: Part I, July 2002
- Part II: Reference of Sheep Health in the United States, 2001, April 2003
- Highlights of NAHMS Sheep 2001: Part II, April 2003
- Lamb Marketing Patterns in the United States, 2000, (info sheet) April 2003
- Part III: Lambing Practices, Spring 2001, April 2003
- Highlights of NAHMS Sheep 2001: Part III, April 2003
- **Part IV: Baseline Reference of 2001 Sheep Feedlot Health and Management, January 2004**
- Highlights of NAHMS Sheep 2001: Part IV, January 2004
- Sheep Quality Assurance (info sheet), expected winter 2004
- Biosecurity on U.S. Sheep Operations (info sheet) April 2003
- Preventive Health Measures: Vaccination Practices on U.S. Sheep Operations, 2001 (info sheet) expected winter 2004

4) Describe nutritional practices and micronutrient intake levels that may impact sheep health, by region.

- Part II: Reference of Sheep Health in the United States, 2001, April 2003